Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of claims:

1. (Previously presented) A voltage conversion device having a reactor for temporarily storing energy based on a current from a power source, for converting a voltage of the power source, which is input while utilizing the reactor, into a desired voltage through switching of a switching element to output, comprising:

a condition detection circuit for detecting an electromotive voltage and inner resistance of the power source as a condition of the power source; and

a control circuit for setting a current range of the power source based on output characteristic of the power source corresponding to the detected condition of the power source and for applying switching control to the switch element such that the current of the power source remains within the current range set by a current range setting circuit,

wherein

the power source is chargeable and dischargeable, and,

an output obtained through conversion into the desired voltage is supplied to a load.

2. (Canceled)

3. (Original) The voltage conversion device according to claim 1, wherein the current range is a range an upper limit of which is a current corresponding to a maximum output in the output characteristics of the power source.

4. (Original) The voltage conversion device according to claim 1, wherein the output characteristic of the power source is a characteristic expressed in the form of a secondary function including a variable which is a current of the power source.

5. (Previously presented) A voltage conversion device having a structure in which an upper switching element and a lower switching element are serially connected and a reactor for temporarily storing energy based on a current from a power source is connected to a connection point of the both switching elements, for converting a voltage

of the power source, which is input while utilizing the reactor, into a desired voltage through switching of the switching elements, the voltage conversion device, comprising:

a condition detection circuit for detecting an electromotive voltage of the power source and a voltage on an output side of the voltage conversion device as a condition of the power source; and

a control circuit for setting a ratio range based on output characteristics of the power source corresponding to the detected condition of the power source, the ratio range being a range of ratios each between a period with the upper switching element remaining in an ON state and a period with the lower switching element remaining in an ON state, and for controlling the ratio between the periods with the respective switching elements remaining in an ON state so as to remain within the set ratio range,

wherein

the power source is chargeable and dischargeable, and,

an output obtained through conversion into the desired voltage is supplied to a load.

6. (Canceled)

7. (Original) The voltage conversion device according to claim 5, wherein the ratio range is a range a lower limit of which is a ratio corresponding to a maximum output in the output characteristic of the power source.

8. (Original) The voltage conversion device according to claim 5, wherein the output characteristics of the power source is a characteristic expressed in the form of a secondary function including a variable which is a ratio between the periods with the respective switching elements remaining in an ON state.

9. (Previously presented) A voltage conversion device having a reactor for temporarily storing energy based on a current from a power source, for converting a voltage of the power source, which is input while utilizing the reactor, into a desired voltage through switching of a switching element to output, comprising:

a voltage detection circuit for detecting a voltage of the power source; and

a control circuit for applying switching control to the switching element such that the detected voltage remains within a predetermined range which is determined based on the electromotive voltage of the power source,

wherein

the power source is chargeable and dischargeable, and,

an output obtained through conversion into the desired voltage is supplied to a load.

10. (Canceled)

11. (Currently amended) A voltage conversion device having a reactor for temporarily storing energy based on a current from a power source, for converting a voltage of the power source, which is input while utilizing the reactor, into a desired voltage through switching of a switching element to output, comprising:

a voltage detection circuit for detecting a voltage of the power source; and

a control circuit for applying switching control to the switching element such that the detected voltage remains within a predetermined range which is determined based on the electromotive voltage of the power source,

wherein

the power source is chargeable and dischargeable,

an output obtained through conversion into the desired voltage is supplied to a load, and

~~The voltage conversion device according to claim 10, wherein~~ the predetermined range is a range a lower limit of which is a half of the electromotive voltage of the power source.

12. (Previously presented) A voltage conversion device for converting a voltage of a power source into a desired output voltage, comprising:

a reactor having one end connected to one end of the power source;

a switching circuit having a first switching element positioned between other end of the reactor and an output terminal and a second switching element positioned between the other end of the reactor and other end of the power source; and

a control circuit for controlling switching of the first and second switching elements of the switching circuit,

wherein

the power source is chargeable and dischargeable,

the desired output voltage is supplied to a load, and

the control circuit limits a ratio between periods with the first and second switching elements remaining in an ON state such that the ratio remains in a predetermined range, based on permissible current capacities of the first and second switching element by controlling such that a proportion of a period with either one of the

first and second switching elements remaining in an ON state, relative to combined periods with the first and second switching elements relatively remaining in an ON state remains equal to or smaller than (Vbo-RbxIbmax)/Vc, Vbo representing an output voltage of the power source, Rb representing inner resistance of the power source, Ibmax representing a permissible current capacity of the switching element, and Vc representing the output voltage.

13. (Canceled)

14. (Previously presented) A voltage conversion device for converting a voltage of a power source into a desired output voltage, comprising:

a reactor having one end connected to one end of the power source;

a switching circuit having a first switching element positioned between other end of the reactor and an output terminal and a second switching element positioned between the other end of the reactor and other end of the power source;

a control circuit for controlling switching of the first and second switching elements of the switching circuit; and

a current detector for detecting a current flowing through the first or second switching element,

wherein

the power source is chargeable and dischargeable,

the desired output voltage is supplied to a load, and

the control circuit limits a ratio between periods with the first and second switching elements remaining in an ON state based on the detected current value such that the ratio remains in a predetermined range by controlling such that a proportion of a period with either one of the first and second switching elements remaining in an ON state, relative to combined periods with the first and second switching elements relatively remaining in an ON state remains equal to or smaller than (Vbo-RbxIbmax)/Vc, Vbo representing an output voltage of the power source, Rb representing inner resistance of the power source, Ibmax representing a maximum value of a current of the power source, and Vc representing the output voltage.

15. (Canceled)

16. (Previously presented) A driving system for driving a load using a power output from a voltage conversion device for converting a voltage of a power source into a desired output voltage,

wherein

the voltage conversion device according to ~~any one of claims 1 through 11~~ claim 1 is used as the voltage conversion device,

the driving system comprises a load driving control circuit for controlling an output of the load while receiving a voltage output from the voltage conversion device,

the power source is chargeable and dischargeable, and,

the desired output voltage is supplied to a load.

17. (Original) The driving system according to claim 16, further comprising:

a storage circuit positioned between the voltage conversion device and the load, for temporarily storing an output from the voltage conversion device,

wherein

the load driving control circuit has a circuit for limiting an output of the load according to a stored voltage of the storage circuit.

18. (Original) The driving system according to claim 17, wherein the load driving control circuit terminates driving of the load when a deviation between the stored voltage and a target voltage of the storage circuit is equal to or exceeds a predetermined value despite control by the load driving control circuit.

19. (Original) The driving system according to claim 16, wherein the load has a motor for rotation driving while receiving a power and a power adjustment circuit for adjusting the power output from the voltage conversion device into a power suitable for driving of the motor and supplying to the motor.

20. (Original) A vehicle carrying the driving system according to claim 19, wherein the motor is a motor for a vehicle.

21. (Previously presented) A voltage conversion method for converting a voltage of a power source, which is input while utilizing a reactor for temporarily storing energy based on a current from the power source, into a desired voltage through switching of a switching element to output, comprising:

detection of an electromotive voltage and inner resistance of the power source as a condition of the power source;

setting a current range of the power source based on output characteristic of the power source corresponding to the detected condition of the power source; and

applying switching control to the switch element such that the current of the power source remains within the set current range,

wherein

the power source is chargeable and dischargeable, and,

an output obtained through conversion into the desired voltage is supplied to a load.

22. (Previously presented) A method for converting a voltage of a power source utilizing a voltage conversion device having a structure in which an upper switching element and a lower switching element are serially connected and a reactor for temporarily storing energy based on a current from a power source is connected to a connection point of the both switching elements, into a desired voltage through switching of the switching elements, the voltage of the power source being input while utilizing the reactor, the method, comprising:

detecting an electromotive voltage of the power source and a voltage on an output side of the voltage conversion device as a condition of the power source;

setting a ratio range based on output characteristics of the power source corresponding to the detected condition of the power source, the ratio range being a range of ratios each between a period with the upper switching element remaining in an ON state and a period with the lower switching element remaining in an ON state; and

controlling the ratio between the periods with the respective switching elements remaining in an ON state so as to remain within the set ratio range,

wherein

the power source is chargeable and dischargeable, and,

an output obtained through conversion into the desired voltage is supplied to a load.

23. (Previously presented) A voltage conversion method for converting a voltage of a power source, which is input while utilizing a reactor for temporarily storing energy based on a current from the power source, into a desired voltage through switching of a switching element to output, comprising:

detecting a voltage of the power source; and

applying switching control to the switching element such that the detected voltage remains within a predetermined range which is determined based on the electromotive voltage of the power source,

wherein

the power source is chargeable and dischargeable, and,

an output obtained through conversion into the desired voltage is supplied to a load.

24. (Previously presented) A voltage conversion method for converting a voltage of a power source into a desired output voltage, comprising a reactor having one end connected to one end of the power source and a switching circuit having a first switching element positioned between other end of the reactor and an output terminal and a second switching element positioned between the other end of the reactor and other end of the power source,

wherein

a ratio between periods with the first and second switching elements remaining in an ON state is limited so as to remain in a predetermined range, based on permissible current capacities of the first and second switching elements by controlling such that a proportion of a period with either one of the first and second switching elements remaining in an ON state, relative to combined periods with the first and second switching elements relatively remaining in an ON state remains equal to or smaller than (Vbo-RbxIbmax)/Vc, Vbo representing an output voltage of the power source, Rb representing inner resistance of the power source, Ibmax representing a permissible current capacity of the switching element, and Vc representing the output voltage,

the power source is chargeable and dischargeable, and,

an output obtained through conversion into the desired voltage is supplied to a load.

25. (Canceled)

26. (Previously presented) A voltage conversion method for converting a voltage of a power source into a desired output voltage, comprising a reactor having one end connected to one end of the power source and a switching circuit having a first switching element positioned between other end of the reactor and an output terminal and a second switching element positioned between the other end of the reactor and other end of the power source,

wherein

a ratio between periods with the first and second switching elements remaining in an ON state is limited so as to remain in a predetermined range, based on a magnitude of a current flowing through the first or second switching element by controlling such that a proportion of a period with either one of the first and second switching element

remaining in an ON state, relative to combined periods with the first and second switching element relatively remaining in an ON state remains equal to or smaller than (Vbo-RbxIbmax)/Vc, Vbo representing an output voltage of the power source, Rb representing inner resistance of the power source, Ibmax representing a maximum value of a current of the power source, and Vc representing the output voltage,

the power source is chargeable and dischargeable, and,

an output obtained through conversion into the desired voltage is supplied to a load.

27. (Canceled)

28. (Previously presented) A computer readable recording medium storing a control program for controlling a voltage conversion device having a reactor for temporarily storing energy based on a current from a power source which is chargeable and dischargeable, for converting a voltage of the power source, which is input while utilizing the reactor, into a desired voltage through switching of a switching element to output to a load, the program having a computer to execute:

detecting an electromotive voltage and inner resistance of the power source as a condition of the power source;

setting of a current range of the power source based on output characteristics of the power source corresponding to the detected condition of the power source; and

switching control of the switching element such that the current of the power source remains within a current range set by a current range setting circuit.

29. (Previously presented) A computer readable recording medium storing a control program for controlling a voltage conversion device having a structure in which an upper switching element and a lower switching element are serially connected and a reactor for storing, as energy, a current from a power source which is chargeable and dischargeable is connected to a connection point of both the switching elements, for converting a voltage of the power source, which is input while utilizing the reactor, into a desired voltage through switching of a switching element to output to a load, the program having a computer to execute:

detecting an electromotive voltage of the power source and a voltage on an output side of the voltage conversion device as a condition of the power source;

setting of a ratio range based on output characteristics of the power source corresponding to the detected condition of the power source, the ratio range being a

range of ratios each between a period with the upper switching element remaining in an ON state and a period with the lower switching element remaining in an ON state, and

control of the ratio between the periods with the respective switching elements remaining in an ON state so as to remain within the ratio range set by a ratio range setting circuit.

30. (Previously presented) A computer readable recording medium storing a control program for controlling a voltage conversion device having a reactor for temporarily storing energy based on a current from a power source which is chargeable and dischargeable, for converting a voltage of the power source, which is input while utilizing the reactor, into a desired voltage through switching of a switching element to output to a load, the program having a computer to execute switching control of the switching element such that the voltage of the power source remains within a predetermined range which is determined based on the electromotive voltage of the power source.

31. (Previously presented) A computer readable recording medium storing a control program for controlling a voltage conversion device comprising a reactor having one end connected to one end of a power source which is chargeable and dischargeable and a switching circuit having a first switching element positioned between other end of the reactor and an output terminal and a second switching element positioned between the other end of the reactor and other end of the power source, for converting a voltage of the power source into a desired output voltage to supply to a load, the program having a computer to execute:

limitation of a ratio between periods with the first and second switching elements remaining in an ON state so as to remain in a predetermined range, based on permissible current capacities of the first and second switching elements by controlling such that a proportion of a period with either one of the first and second switching elements remaining in an ON state, relative to combined periods with the first and second switching elements relatively remaining in an ON state remains equal to or smaller than (Vbo-RbxIbmax)/Vc, Vbo representing an output voltage of the power source, Rb representing inner resistance of the power source, Ibmax representing a permissible current capacity of the switching element, and Vc representing the output voltage.

32. (Previously presented) A computer readable recording medium storing control program for controlling a voltage conversion device comprising a reactor having one end connected to one end of a power source which is chargeable and dischargeable

and a switching circuit having a first switching element positioned between other end of the reactor and an output terminal and a second switching element positioned between the other end of the reactor and other end of the power source, for converting a voltage of the power source into a desired output voltage to supply to a load, the program having a computer to execute:

limitation of a ratio between periods with the first and second switching elements remaining in an ON state so as to remain in a predetermined range, based on a magnitude of a current flowing through the first or second switching element by controlling such that a proportion of a period with either one of the first and second switching elements remaining in an ON state, relative to combined periods with the first and second switching elements relatively remaining in an ON state remains equal to or smaller than (Vbo-RbxIbmax)/Vc, Vbo representing an output voltage of the power source, Rb representing inner resistance of the power source, Ibmax representing a maximum value of a current of the power source, and Vc representing the output voltage.

33. (Previously presented) A control program for controlling a voltage conversion device having a reactor for temporarily storing energy based on a current from a power source which is chargeable and dischargeable, for converting a voltage of the power source, which is input while utilizing the reactor, into a desired voltage through switching of a switching element to output to a load, the program having a computer to execute:

detection of an electromotive voltage and inner resistance of the power source as a condition of the power source;

setting of a current range of the power source based on output characteristic of the power source corresponding to the detected condition of the power source; and

switching control of the switch element such that the current of the power source remains within the current range set by a current range setting circuit.

34. (Previously presented) A control program for controlling a voltage conversion device having a structure in which an upper switching element and a lower switching element are serially connected and a reactor for storing energy based on a current from a power source which is chargeable and dischargeable is connected to a connection point of both the switching elements, for converting a voltage of the power source, which is input while utilizing the reactor, into a desired voltage through switching of a switching element to output to a load, the control program having a computer to execute:

detection of an electromotive power source and a voltage on an output side of the voltage conversion device;

setting of a ratio range based on output characteristics of the power source corresponding to the detected condition of the power source, the ratio range being a range of ratios each between a period with the upper switching element remaining in an ON state and a period with the lower switching element remaining in an ON state; and

control of the ratio between the periods with the respective switching elements remaining in an ON state so as to remain within the ratio range set by a ratio range setting circuit.

35. (Previously presented) A control program for controlling a voltage conversion device having a reactor for temporarily storing energy based on a current from a power source which is chargeable and dischargeable, for converting a voltage of the power source, which is input while utilizing the reactor, into a desired voltage through switching of a switching element to output to a load, the program having a computer to execute:

switching control of the switch element such that the voltage of the power source remains within a predetermined range which is determined based on the electromotive voltage of the power source.

36. (Previously presented) A control program for controlling a voltage conversion device comprising a reactor having one end connected to one end of a power source which is chargeable and dischargeable and a switching circuit having a first switching element positioned between other end of the reactor and an output terminal and a second switching element positioned between the other end of the reactor and other end of the power source, for converting a voltage of the power source into a desired output voltage to supply to a load, the program having a computer to execute:

limitation of a ratio between periods with the first and second switching elements remaining in an ON state so as to remain in a predetermined range, based on permissible current capacities of the first and second switching elements by controlling such that a proportion of a period with either one of the first and second switching elements remaining in an ON state, relative to combined periods with the first and second switching elements relatively remaining in an ON state remains equal to or smaller than (Vbo-RbxIbmax)/Vc, Vbo representing an output voltage of the power source, Rb representing inner resistance of the power source, Ibmax representing a permissible current capacity of the switching element, and Vc representing the output voltage.

37. (Previously presented) A control program for controlling a voltage conversion device comprising a reactor having one end connected to one end of a power source which is chargeable and dischargeable and a switching circuit having a first switching element positioned between other end of the reactor and an output terminal and a second switching element positioned between the other end of the reactor and other end of the power source, for converting a voltage of the power source into a desired output voltage to supply to a load, the program having a computer to execute:

limitation of a ratio between periods with the first and second switching elements remaining in an ON state so as to remain in a predetermined range, based on a magnitude of a current flowing through the first or second switching element by controlling such that a proportion of a period with either one of the first and second switching elements remaining in an ON state, relative to combined periods with the first and second switching elements relatively remaining in an ON state remains equal to or smaller than (Vbo-RbxIbmax)/Vc, Vbo representing an output voltage of the power source, Rb representing inner resistance of the power source, Ibmax representing a maximum value of a current of the power source, and Vc representing the output voltage.